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Sept.

UNITED STATES DEPARTMENT OF AGRICULTURE
Rural Electrification Administration
Technical Standards Committees
(Electric)

Supplement No. 1, October 1983, to
REA Bulletin 43-5
LIST OF MATERIALS ACCEPTABLE FOR USE ON
SYSTEMS OF REA ELECTRIFICATION BORROWERS

The attached pages for the "List of Materials Acceptable for Use on Systems of REA Electrification Borrowers" are those which have been revised by action of the Technical Standards Committees during the months of July through September 1983. The following changes should be made in order to keep it up to date. Pages with a comma between them are on the same sheet, both being changed.

<u>Add New Page</u>	<u>Remove Page</u>	<u>Add New Page</u>	<u>Remove Page</u>
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x	x	ga-4	ga-4
aa,ab	aa,ab	ga-5	ga-5
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ap-2	ap-2	U ae(1)	U ae(1)
av-5	av-5	U an-1.1	U an-1.1
ba	ba	U an-2	U an-2
bo	bo	U ax(1)	
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cg-2	cg-2	U hv-3	U hv-3
cg(1)	cg(1)	U hv-4	U hv-4
dt	dt	U ja(2)	U ja(2)

U.S. DEPT. OF AGRICULTURE
RURAL ELECTRIFICATION ADMINISTRATION
73

c
October 1983

c - Bolt, machine

Applicable Specification: ANSI C135.1, "Standards for Galvanized Steel Bolts and Nuts," except that the lengths are in the ranges given below.

Applicable Sizes : 1/2 inch diameter, 6 through 10 inch length
5/8 inch diameter, 6 through 24 inch length
3/4 inch diameter, 6 through 26 inch length
7/8 inch diameter, 6 through 28 inch length

The following manufacturers have shown compliance with the applicable specifications for machine bolts:

A. B. Chance Company
Dixie Electrical Manufacturing Company
Hughes Brothers
*Joslyn Manufacturing Company
Kortick Manufacturing Company
*McGraw-Edison
*Portland Bolt & Manufacturing Company
Utilities Service Company



**"Static proof" design available.

d - Washers

Flat Steel

Size, inches:	2 $\frac{1}{4}$ x 2 $\frac{1}{4}$	3 x 3	4 x 4	4 x 4	1-3/8 round	1-3/4 round
Thickness, in.:	3/16	4	3/16	4	12 gauge	10 gauge
Hole Diam., in.:	13/16	13/16	13/16	13/16	9/16	11/16

Chance	6814	6817	6818	6819 $\frac{1}{2}$	6803	6805
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Dixie	D6814	D6817	D6818	D6819 $\frac{1}{2}$	D6803	-
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Hughes	SW2 $\frac{1}{4}$ -70	SW3-70	SW4-70	SW4-70(4 $\frac{1}{2}$)	RW1-3/8-50	-
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Joslyn	J1076	J22596	J1080	J1473	J1086	-
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Kortick	K1553	K1555	K1557	K1559 $\frac{1}{2}$	K1524	K1525
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McGraw-Edison	DF2W5	DF2W7	DF2W10	DF2W15	DF1W2	DF1W3
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Power Line Hardware	SWF225A	SWF33B	SWF44A			
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Utilities Serv.	5485	5487A	5488	5490A	5478	5479
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Size, inches:	2 $\frac{1}{4}$ x 2 $\frac{1}{4}$	3 x 3	3 x 4	4 x 4	3 round
Thickness, in.:	4	5/16	7/16	4	3/16
Hole Diam., in.:	11/16	11/16	15/16	13/16	13/16

(spurred)

Barron Bethea (Nodular Iron)	GCW-1A ^o BB-214	GCW-31 ^o	CRW-4A ^o	GCW-41 ^o	-
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Bethea/National (Aluminum Alloy)	-	WC-33-5 ^o	WC-34-7 ^o	WC-44-6 ^o	-
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Continental (Nodular Iron)	-	CW-33-5 ^o	CW-34-7 ^o	CW-44-6 ^o	TCSF-30-6
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Flagg (MIF) (Malleable Iron)	P141 ^o P56A	P143 ^o	P120 ^o	P144 ^o	PX159A
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Joslyn (Steel)	-	J114 ^o	-	-	-
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Lapp (Line Ware) (Malleable Iron)	304075 ^o 304089	304078 ^o	-	304082 ^o	-
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Power Line Hardware		CSW-33 ^o	CRW-34 ^o	CSW-44 ^o	
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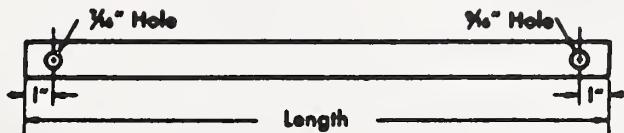
* Curved

h
July 1983

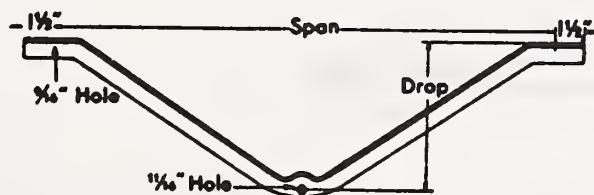
h - Brace, crossarm, steel

Size (inches)	$1\frac{1}{4} \times \frac{1}{4}$	$1\frac{1}{2}$ angle x 3/16
Style	Flat	Bow
Centers (inches)	26	60
Length (inches)	28	-
Drop (inches)	-	18

Chance	7128	6942
Dixie	D7128	D6942
Hughes Brothers	2809.5	-
Joslyn	J7128	J1508
Kortick	K1428	K18.5
McGraw-Edison	DB2F5	DB1E5
 Utilities Service	5243	5217



Flat Brace



Bow Brace

NOTE: The braces listed on this page may, at the borrower's option, be substituted for wood braces, Item cu, specified on 7.2/12.5 kV drawings. They may not be used for 14.4/24.9 kV construction.

i
October 1983

i - Bolt, carriage

Applicable Specification: ANSI C135.1, "Standards for Galvanized Steel Bolts and Nuts."

Applicable Sizes : 3/8 inch diameter, 3 through 6 inch length

1/2 inch diameter, 3 through 6 inch length

The following manufacturers have shown compliance with the applicable specifications for carriage bolts:

A. B. Chance Company
Dixie Electrical Manufacturing Company
Hughes Brothers
Joslyn Manufacturing Company
Kortick Manufacturing Company
McGraw-Edison
Utilities Service Company



k - Insulator, Distribution Deadend

<u>Manufacturer</u>	<u>Meeting No. and Date</u>	<u>Conditions</u>
<u>Chance</u>		
Distribution deadend	965	For the purpose of gaining operating experience as follows:
Catalog No. C654-0000	4/22/71	1. For distribution lines only.
"Epoxilator II" (15 kV line-to-line)	1082	2. Recommended maximum working load is 5,000 lbs.
Catalog No. C654-2500	1/22/76	3. Not recommended for use in areas subject to contamination.
"Epoxilator II" (25 kV line-to-line)	1129 12/15/77	
<u>Joslyn</u>		
Distribution deadend	1074	1. For distribution lines only, up to 15 kV line-to-line voltage.
UDI 671-3002	9/25/75	
	1088	
	4/15/76	
Distribution deadend	1074	1. For distribution lines only, up to 25 kV line-to-line voltage.
UDI 671-3010	9/25/75	
	1088	
	4/15/76	
<u>Plastigage</u>		
Distribution deadend	1158	1. For distribution lines only.
H-15 kV-4	3/1/79	2. To obtain experience.
H-25 kV 6	1208	3. Not recommended for use in areas subject to contamination.
	3/19/81	
<u>Salisbury</u>		
Distribution deadend	1226	1. For distribution lines only.
Catalog No. 9501, 15 kV	1/7/82	2. To be used only in a horizontal position on deadends.
Catalog No. 9502, 25 kV		3. Recommended maximum working load is 5,000 lbs.
		4. Not recommended for use in areas subject to contamination.

NOTE: When insulators from this page are used, adjust construction drawing material list quantities as necessary.

July 1983

1 - Clamp, deadend

DISTRIBUTION

Copper 2 through 6 CWC 4A through 8A		ACSR (Aluminum Clamps)			
		4/0 & 3/0	2/0	1/0	2 & 4
-	ALCOA	302	302	302	302
-	American Connector Engineering	QDA-63	QDA-53	QDA-53	QDA-53
MD-52-N	Anderson/Sq.D	PG57N	PG57	PG-46N	PG-46N
-	Bethea/National	DA-20N	DA-15-N	DA-15-N	DA-15-N
-	Continental	AQD-63	AQD-52	AQD-52	AQD-52
-	C & R	CR-20-90	CR-10-90	CR-10-90	CR-10-90
2111	Joslyn	BT5210	J25392	J25389	J25389
2111	Knox	5210			
-	Lapp	306120N	306118N	306118N	306118N
80500	Ohio Brass	89237	86534	86534	86534

m-1
October 1983

m - Clamp, suspension

2 BOLT - DISTRIBUTION

	<u>Copper & CWC</u>	<u>ACSR with 4</u>	<u>Straight or 2</u>	<u>Formed 1/0 & 2/0</u>	<u>Armor Rods 3/0 & 4/0</u>
Anderson/Square D	MS-46-N	MS-60-N	MS-70-N	HAS-85-N	HAS-104-N
Barron Bethea	FWG-1	FWG-2	FWG-3	FWG-4	-
Bethea/National	FS-46-N	GW-1-N	LS-0-N	LS-1-N	LS-2-N
C & R Products	-	-	-	CRSC-1	CRSC-2
Continental Electric	FSC-46-N	FSC-60-N	SC-70-N	SC-85-N	SC-105-N
Dulmison	-	-	-	-	AGS*
Brown Boveri Elec. (ITE)	6240	6241	6242	6243	6244
Joslyn (Brewer-Titchener)	6240	6241	6242	6243	6244
Knox	6240A-U	6241A-U	6242A-U	6243A-U	6244A-U
Lapp	305740N	306027N	306028N	306029N	306030N
Ohio Brass	83044	83064	83074	83084	83104
Preformed	-	-	-	-	AGS*

*Accepted for larger sizes.

m-2
July 1983

m - Clamp, Suspension

ANGLE - DISTRIBUTION
No. 2 & 4 ACSR
Plus Rods

2-BOLT TRANSMISSION
For 3/8" Steel Overhead
Ground Wire

AAC-68-90	Anderson/Square D	MS-46-N
-	Barron Bethea	FGW-1
RALS-1	Bethea/National	FS-46-N
AC-75	Continental	FSC-46N
GD-907A	Fargo	-
2300	Brown Boveri Elec.(ITE)	6240
2300	Joslyn (Brewer-Titchener)	6240
2300	Knox	6240A-U
306092	Lapp	305740N
82860	Ohio Brass	83044
AC-1660	Power Line Hardware	

n
October 1983

n - Bolt, double arming

Applicable Specification: ANSI C135.1, "Standards for Galvanized Steel Bolts and Nuts."

Applicable Sizes : 5/8 inch diameter, 12 inch through 24 inch length

3/4 inch diameter, 20 inch through 24 inch length

The following manufacturers have shown compliance with the applicable specifications for double arming bolts:

A. B. Chance Company
Dixie Electrical Manufacturing Company
Hughes Brothers
*Joslyn Manufacturing Company
Kortick Manufacturing Company
*McGraw-Edison
Portland Bolt & Manufacturing Company
Utilities Service Company



*"Static proof" designs available.

o
October 1983

o - Bolt, eye, oval

Applicable Specification: ANSI C135.4, "Standards for Galvanized Ferrous Eye Bolts and Nuts for Overhead Line Construction."

Applicable Sizes : 5/8 inch diameter, 6 inch through 20 inch length

3/4 inch diameter, 8 inch through 20 inch length

The following manufacturers have shown compliance with the applicable specifications for oval eye bolts:

Berny's Forging Company
A. B. Chance Company
Dixie Electrical Manufacturing Company
*Joslyn Manufacturing Company
Kortick Manufacturing Company
*McGraw-Edison
Utilities Service Company

*"Static proof" designs available.



Shoulder Eye Bolt
for Transmission Structures

3/4 inch diameter, 8 inch through 20 inch length

Catalog Number

Joslyn	J9528 to J9540
Kortick	K9558 to K2570
McGraw-Edison	DF10E8 thru DF10E20

u - Deadend for alumoweld guy strand

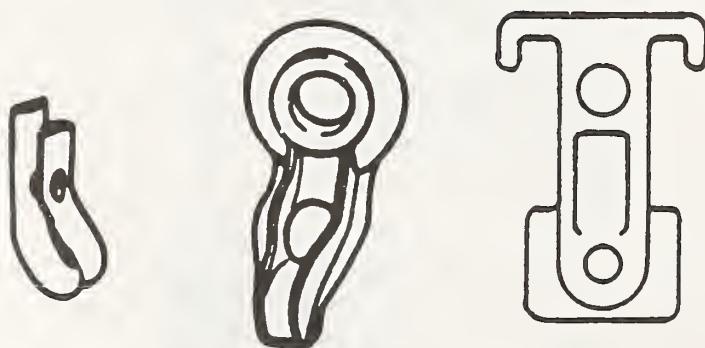
Strand Size	3#10(4M)	7#12(6M)	7#11(8M)	7#10(10M)	7X.110"(11.5M)	7#9(12.5M)	7X121"(14M)	7#8(16M)	7X.148"(20M)
<u>Formed Type</u>									
<u>Alumoweld Guy Strand</u>									
<u>Chance</u>									
For standard guy	6M-AWSBG	8M-AWSBG	10M-AWSBG						12.5M-AWSBG
<u>Helical Line Prod.</u>									
For standard guy	HG517-6M	HG519-8M	HG521-10M						HG523-12.5M
<u>Preformed Line Prod.</u>									
For standard guy	AWDE-4108	AWDE-4110	AWDE-4113	AWDE-4116	AWDE-4118	AWDE-4119	AWDE-4120	AWDE-4122AWDE-4126	
For wrapped guy	WGL-4110	WGL-4113	WGL-4116		WGL-4120				

Automatic
Alumoweld Guy Strand

Fargo	GDE-300	GDE-301	GDE-301	GDE-302
Reliable	5200	5201	5201	5202

v - Guy attachment
for 5/8" bolt

Type:	Formed Strap	Angle Bolt Eye	Guy Hook	Pole Eye Plate
Maximum Working Load Rating	23,130 N (5200 lbs.)	23,130 N (5200 lbs.)	23,130 N (5200 lbs.)	37,800 N (8500 lbs.)
Anderson Elec./ Square D	-	-	-	GSP-05
Barron Bethea	-	-	GH-5*-	-
Bethea/National	-	-	AG-5*	PE5-6A
Champ	-	-	CH58GH*	CH21PE
Chance	5004	0100	C203-0168*	-
Continental Electric	-	-	GAD-56-4	PEP-66-45
Dixie	D5004	D0100	DD-9460, DD9462*	-
Flagg (MIF)	-	-	P151A, P151X*	PX88
Joslyn	J25164	J6500	J6555, J6556	-
Kortick	K4035, K4047	K3140	-	-
Lapp (Line Ware)	-	-	304014*	304021
McGraw-Edison	DG6H1	DG11E1	DG21H1 DG21H2	-
Power Line Hardware	-	-	HGA-58C*	PGA-548
Util. Service	31030	5531	-	-



*This hook may also be used in place of the wrapped guy arrangement in assemblies E3-2 and E3-3.

October 1983

x - Rod, anchor

Applicable Specification: ANSI C135.2, "Standards for Galvanized Ferrous Strand Eye Anchor Rods."

Applicable Sizes: Single guy - 5/8 inch diam. 6, 7 and 8 feet long
- 3/4 inch diam. 8, 9 and 10 feet long
- 1 inch diam. 9 and 10 feet long

Double guy - 5/8 inch diam. 7 and 8 feet long
- 3/4 inch diam. 8, 9 and 10 feet long
- 1 inch diam. 9 and 10 feet long

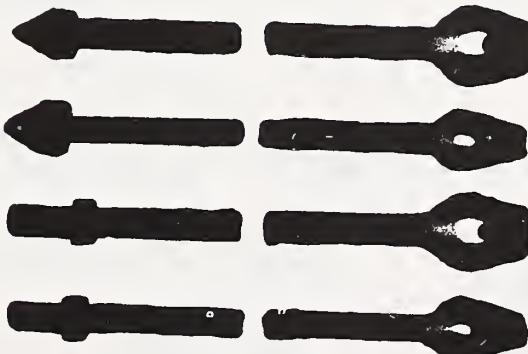
Single Guy Drive - 5/8 inch diam. 7 and 8 feet long
- 3/4 inch diam. 8, 9 and 10 feet long
- 1 inch diam. 9 and 10 feet long

Double Guy Drive - 5/8 inch diam. 7 and 8 feet long
- 3/4 inch diam. 8, 9 and 10 feet long
- 1 inch diam. 9 and 10 feet long

The following manufacturers have shown compliance with the applicable specifications. Some manufacturers cannot supply all sizes listed above. Check with manufacturer or distributor for availability.

Blackburn
Chance
Dixie
Grip-Tite

Joslyn
Kortick
McGraw-Edison
Utilities Service



y - Galvanized Steel Strand

Applicable Specification: ASTM A475 (Class A, B or C Coating)

<u>Manufacturer</u>	<u>DISTRIBUTION GUY STRAND</u>						<u>Extra High Strength (EHS)</u>
	<u>1/4"</u>	<u>3/8"</u>	<u>5/16"</u>	<u>9/32"</u>	<u>High Strength (HS)</u>	<u>7/16"</u>	
Alcan Cable	x	x	x		x	x	x
Armaco Steel Corp.	x	x	x	x	x	x	x
Bethlehem Steel	x	x	x	x	x	x	x
CP&I	x	x	x	x	x	x	x
Cal-Mire	x	x	x	x	x	x	x
Davis Walker	x	x	x	x	x	x	x
Florida Wire and Gable	x	x	x	x	x	x	x
Indiana Steel and Wire	x	x	x	x	x	x	x
Paulsen Wire Rope Corp.	x	x	x	x	x	x	x
Seal Wire Co.	x	x	x	x	x	x	x
Southwire	x	x	x	x	x	x	x
Texstrand	x				x	x	x
U. S. Steel	x	x	x	x	x	x	x

Note: The buyer should specify Class A, B or C coating per ASTM Specification A475.

z - Anchors

<u>Manufacturer</u>	<u>Meeting No. and Date</u>	<u>Conditions</u>
<u>Chance</u>		
Screw anchors, power installed	1252 2/3/83	To obtain experience.
24462 (6,000 and 8,000 lb.) 12332P 5/8" rod 12587 5/8" thimbleye		
24484 (10,000 and 12,000 lb. anchor helix) 12632P (3/4" rod) 6512 (thimbleye nut)		
<u>Dixie</u>		
Screw anchors, power- installed	859 2/9/67	To obtain experience.
D-1162-G (6,000 & 8,000 lb., 5/8" rod) D-1375-G (10,000 & 12,000 lb., 3/4" rod)		
<u>Joslyn</u>		
Screw anchors, power- installed	973 8/19/71	To obtain experience.
J11b_CA (6,000 & 8,000 lb., 5/8" rod) J13C_CA (10,000 & 12,000 lb., 3/4" rod)		
<u>McGraw-Edison</u>		
Screw anchors, power- installed	992 5/25/72	To obtain experience.
DALLG621 (6,000 & 8,000 lb.. 5/8" rod)		
<u>Foresight</u>		
Duckbill Service Anchor #250 (2500 lbs., 5/8" rod)	1202 12/18/80	To obtain experience.
Duckbill Anchor #400 (6000 & 8000 lbs., 3/4" rod) #800 (10,000 & 12,000 lbs., 1" rod)		

NOTES: Where galvanized anchors are listed, the same anchors ungalvanized (black asphalt coated) are also acceptable.

Catalog numbers shown are for anchors with 1-3/8" hubs. Equivalent anchors with 1-1/2" hubs are also acceptable. (A special installing wrench is required.)

aa, ab
October 1983

aa - Nut, eye
ab - Nut, thimble eye
5/8 inch

Eye Nut
Conventional



Eye Nut
Eyelet



Thimble
Eye Nut



	<u>Eye Nut</u> <u>Conventional</u>	<u>Eye Nut</u> <u>Eyelet</u>	<u>Thimble</u> <u>Eye Nut</u>
Barron Bethea	OEN-2A	B-14A	EN-4A
Berny's Forging Co.	OE1	-	-
Bethea/National	E-5	B-5	NT-5
Champ	CH58EN	CH58BE	CH40TN
Chance	6502	-	6510
Continental Electric	EN-5	BE-5	TN-5
Dixie	D6502	DD-6517	D6510
Flagg (MIF)	P125C	P127A	P128A
Hughes	EN60	-	-
Joslyn	J1092	J1126	J6510
Kortick	K4212	K4413	K3111
Lapp (Line Ware)	304008	306267	304010
McGraw-Edison	DG2E3	DG6E1	DG1E1
Power Line Hardware	OEN-1	BEL-1	-
Utilities Service	450	497	C580

Conditional List
aj
July 1983

aj - Clamp, ground rod

<u>Manufacturer</u>	<u>Meeting No. and Date</u>	<u>Conditions</u>
Kearney 18457 ("Squeezon," 5/8 inch)	467 5/6/52	To obtain experience.
Power Line Hardware RC-34 (for 5/8" and 3/4") galvanized or stainless steel ground rod	1114 5/12/77	To obtain experience.
Burndy YGHP (for 5/8" copper- covered rods)	1234 5/13/82	To obtain experience.

al
October 1983

al - Staples, ground wire

Applicable Specification: ANSI C135.14, "Standards for Staples with Rolled or Slash Points."

Length x Spread (inches)	1-1/2 x 1/4	2 x 1/2	1-1/2 x 3/8	3 x 1-1/16
Diameter	9 Gauge <u>Galv. Steel</u>	8 Gauge <u>Galv. Steel</u>	8 Gauge <u>Copperweld</u>	1/4 <u>Moulding</u>
Blackburn	-	-	CUS9	CUS22
Chance	7511-3/4	7512	9167	9161
Copperweld	-	-	CP52	-
Joslyn	J1672G	J157	J6652	J6497
Kortick	-	-	K247	K236
Larson	-	1976-2	7652	75225
Utilities Service	88	86	48	46

Barbed staples, ground wire

Length x Spread (inches)	1-1/2 x 3/8	2 x 5/8	1-1/2 x 3/8	3 x 1-1/16
Diameter	.131 <u>Galv. Steel</u>	.165 <u>Galv. Steel</u>	.140 <u>Copperweld</u>	.7/32 <u>Galv. Steel</u>
Joslyn	J7656	J7672	J7682	J7664

Staples, alumoweld

Length x Spread (inches)	2 x 1/2	1-1/2 x 3/8	3 x 1-1/16
Diameter	<u>8 gauge</u>	<u>8 gauge</u>	<u>1/4 moulding</u>
Joslyn	-	J-6652AL	J-7493AL

Clip, ground wire

Kearney 12326

an - Transformers, 2:1 Ratio, Single Phase,
Autotransformers or Two-Winding Transformers
for Use in System Voltage Conversion

Condition of Acceptance: To obtain experience.

<u>Manufacturer</u>	<u>Designation</u>	<u>Size</u>
<u>Central Moloney</u> 2-WND	AOD	167-500
<u>General Electric</u> 2-WND AUTO	HS STEP HS STEP	167-500 167-1000
<u>Howard Industries</u> 2-WND	STEPS	167-500
<u>McGraw-Edison</u> 2-WND AUTO	"Round-Coil" MEPS-AUTO	167-500 167-1000
<u>H. K. Porter (Delta-Star)</u> 2-WND AUTO	LTD LTD-A	167-500 167-1000
<u>Westinghouse</u> 2-WND	"Jumbo"	167-500

NOTE: Two-winding transformers are self-protected under external short circuit in accordance with ANSI C57.12.90A. Auto-transformers will withstand 25 times rated current under external short circuit in accordance with ANSI C57.12.90A.

ao
October 1983

ao - Bolt, strand eye, straight (thimble eye)

Applicable Specification: ANSI C135.4, "Standards for Galvanized Ferrous Eye Bolts and Nuts for Overhead Line Construction."

Applicable Sizes : 5/8 inch, 6 through 12 inch length
3/4 inch, 8 through 12 inch length

The following manufacturers have shown compliance with the applicable specifications:

A. B. Chance Company
Dixie Electrical Manufacturing Company
Joslyn Mfg. and Supply Company
Kortick Manufacturing Company
*McGraw-Edison
Utilities Service Company



*"Static proof" designs available.

ap - Clamp, hot line
Copper and Copperweld-copper Conductor

<u>Conductor Size</u>			
Copper	2/0	1/0	2 thru 6
Copperweld-copper	<u> </u>	<u>2A</u>	<u>4A thru 8A</u>
Blackburn	PGH3	PGH3	PGH3
Fargo	GH-209	GH-209	GH-209
Weaver	IWS	IWS	IWS

Clamps listed below have springs and enclosed thread chambers. They are recommended for use in areas where severe corrosion or vibration trouble is experienced.

Anderson	BH-00	BH-00	BH-00
Chance	S1530CC	S1520CC	S1520CC
Electrical Specialty	BHC	BHC	BHC
Fargo	GH-100*	GH-100*	GH-100*
Ideal	3532	3532	3532
Penn-Union	HLC-020-LS	HLC-020-LS	HLC-020-LS

*For use with CL Fuse, order GH-201

ap-2
October 1983

ap - Clamp, hot line
ACSR with armor rods

Clamps listed below have spring action and enclosed thread chambers.

Conductor Size		4/0 & 3/0	2/0	1/0 & 2	4
	<u>Tap Conductor</u>				
Anderson	Aluminum	AH-7	AH-4	AH-4	AH-4
	Copper	AH-7-GP	AH-4-GP	AH-4-GP	AH-4-GP
Chance	Aluminum	S1540-AA	S1540-AA	S1530-AA	S1530-AA
	Copper	S1540-AC	S1540-AC	S1530-AC	S1530-AC
Electrical Specialty	Aluminum	-	AHC-2/0	AHC-2/0	AHC-2/0
	Copper	-	AHC-2/0 GP	AHC-2/0 GP	AHC-2/0 GP
Fargo	Aluminum	GH-102A	GH-102A	GH-101A	GH-101A
	Copper	GH-102AC	GH-102AC	GH-101AC	GH-101AC
Penn Union	Aluminum	-	-	HLCA-040	HLCA-040
	Copper			HLCA-040	HLCA-040
Utilco	Aluminum	-	HLC-397	-	HLC-40
Weaver	Aluminum	W-1066AA	W-1066AA	W-6336AA	W-6336AA

av - Conductor, Service
(Single Conductor)

<u>Manufacturer</u>	<u>Aluminum</u>	<u>Copper</u>
Alcan Cable	x	x
Alcoa	x	
Anaconda Ericsson	x	x
Essex	x	x
Kaiser	x	
Phelps Dodge	x	
Pirelli Cable	x	x
Reynolds	x	
Rome Cable	x	x
Southwire	x	

Applicable Specification: IPCEA-NEMA Standard S-66-524

Insulation: Cross-linked thermosetting polyethylene or equal, meeting requirements of Sections 7.3.3 and 7.3.5

Conductor: Physically and electrically equal to MHD copper or HD (EC-H19) aluminum, meeting requirements of Section 7.3.2 (Compact or compressed stranded conductor is acceptable.)

Marking: Manufacturer's name and type of insulation shall be clearly shown in durable markings on the surface of the insulation at intervals no greater than 24 inches.

av-5
October 1983

av - Conductor, Service Cable
(Triplex and Quadruplex)

<u>Manufacturer</u>	<u>Aluminum</u>	<u>Copper</u>
Alcan Cable	x	x
Alcoa	x	
Anaconda Ericsson	x	x
Essex	x	x
Hendrix	x	x
Kaiser	x	
Phillips Cables, Inc. (Marked "Phillips W")	x	
Pirelli	x	x
Reynolds	x	
Rome Cable	x	x
Southwire	x	x

Applicable Specifications: REA Specification D-2, Specifications for
600 Volt Neutral-Supported Secondary Service
Drop Cables.

az
July 1983

az - Pole Numbers and Letters, Metal

(See Drawing M52-3)

Manufacturer

Almetek Industries, Inc.

Premax Products

Catalog No.
"E-Z Tags"

Order by description

1523

ba
October 1983

ba - Bolt, Angle Eye

Thimble Type

Applicable Specification: ANSI C135.4, "Standards for Galvanized Ferrous Eye Bolts and Nuts for Overhead Line Construction."

Applicable Sizes : 5/8 inch, 6 through 12 inch length
3/4 inch, 8 through 12 inch length

The following manufacturers have shown compliance with the applicable specifications:

A. B. Chance Company
Dixie Electrical Manufacturing Company
Joslyn Mfg. and Supply Company
Kortick Manufacturing Company
*McGraw-Edison
Utilities Service Company



*"Static proof" designs available.

bo
October 1983

bo - Shackle, anchor

<u>Manufacturer</u>	<u>Catalog Number</u>
Anderson/Square D	AS-25
Bethea/National	ASH-45
Chance	5801
Continental	AS-25-5-4
Dixie	D5801
Brown Boveri Electric (ITE)	3022
Joslyn	J2742
Knox	3022
Kortick	K4481
Lapp	33852
Lindsey	3260
McGraw-Edison	DC7J1
Ohio Brass	13722
Utilities Service	4106

br

July 1983

br - End Link

<u>Manufacturer</u>	<u>Catalog Number</u>
Bethea/National	CL-5
Brown Boveri Electric (ITE)	3082-HT
Continental	L-5
Joslyn (Brewer-Titchener)	BT-3082-HT
Knox	3082-HT
Lapp	6415-HT
Ohio Brass	79272
Lindsey	3403

by
October 1983

by - Deadend, Automatic and Formed Type

		Conductor Size	
<u>Fargo</u>	<u>Reliable</u>	<u>Cu</u>	<u>CWC</u>
GD-515	27-SDS	-	4A
GD-513	47-SDS	-	6A
GD-512	-	-	8A
GD-515	271	2 x 3	-
GD-512	41LD	4	-
GD-511	61LD	6	-

ACSR

*Fargo	GD-400 Series
*Preformed	OG-9360 thru 9366 #OHDE-9534 thru 9540, 4577
*Reliable	7650 Series

May only be used with a spool insulator (Item cm) and appropriate clevis for neutral and secondary applications.

Aluminum Alloy
(6201 and 5005)

Fargo	GD-A Series
Reliable	AL Series

*For use on distribution only.

Conditional List

by

July 1983

by - Deadends, automatic and formed type

FORMED TYPE

<u>Manufacturer</u>	<u>Meeting No. and Date</u>	<u>Conditions</u>
<u>Preformed Line Products</u>		
AWAC 4 - 4/3 DG-4560	993 6/8/72	To obtain experience.
AWAC 2 - 4/3 DG-4562		
AWAC 1/0 - 4/3 DG-4565		

AUTOMATIC TYPE

<u>Reliable</u>		
AWAC 4-4/3 5201	1026 9/27/73	To obtain experience.
AWAC 2-4/3 5202	1035 2/21/74	
AWAC 1/0-4/3 5204		

Fargo

AWAC 4-4/3 GDA-235	1087 4/1/76	To obtain experience.
AWAC 2-4/3 GDA-240		
AWAC 1/0-4/3 GDA-245		

cg - Switch, air, three-pole, group-operated
NEMA standard switches for station and line structures

<u>Manufacturer</u>	Acceptable Mounting on Structure	Tilting Ins. Type	Vertical Break Type	Side Break Type	Center Break Type	Double Break Type	Break kV
Brown Boveri Elec. (ITE)	Horizontal						
A. B. Chance	Horizontal Phase over Phase Vertical						
Johnson	Horizontal						
Joslyn (Hi-Voltage)	Horizontal Horizontal						
Kearney	Horizontal	NE-2	15-34.5	AR 60-P	15-69		
MEMCO	Horizontal Horizontal	AgF AgC	15-69 15-69	EA	15-34.5	EE	69-230
G & W Electric Company	Horizontal			MK-40	15-69	PMB-40A	15-69
Powerdyne (Kearney)	Horizontal Phase over Phase					V2-V4	15-230
ANIXTER Royal	Phase over Phase Horizontal					V2	15-23
						RG-63(L)	15-69
						RSL-L(L)	15-69

(L) Means gas or solid material full-load interrupters are accepted and available.

(VL) Means vacuum full-load interrupters are accepted and available.

* These switches may be purchased with reduced voltage vacuum interrupters and may be applied for loop sectionalizing duty when peak recovery voltage does not exceed 25 kV.

NOTE: Phase-over-phase mounted switches are not acceptable above 25 kV class unless equipped with full-load interrupters. Switches of 15 kV and 25 kV classes with individual phases mounted on wood crossarms or poles must be supplied with insulated interphase and control rods.

CG-2
October 1983

CG - Switch, air, three-pole, group-operated
NEMA standard switches for station and line structures

<u>Acceptable Mounting on Structures</u>	<u>Tilting Type</u>	<u>Ins. kV</u>	<u>Vertical Type</u>	<u>Break kV</u>	<u>Side Type</u>	<u>Break kV</u>	<u>Center Type</u>	<u>Break kV</u>	<u>Double Break Type</u>	<u>Double Break Type</u>
S & C	Horizontal		Allduti(L)15-34.5		Allduti(L)15-25		Allduti(L)34.5-46			
	Phase over Phase		Allduti(L)15-25		Allduti(L)15-25		Allduti(L)34.5-46			
	Vertical		Allduti(L)*15-34.5		Allduti(L)15-25		Allduti(L)*34.5-46			
SEECO	Phase over Phase				GOABS(VL)15-69					
	Horizontal	H1	15-230		S	15-69				
Siemens-Allis	Horizontal		TA(VL)	15-69	SSB-T		15-69	CCB-115-230		
	Horizontal							CNL-2 115-230		
Southern States	Horizontal		EV	15-230	57K		15-69			
	Phase over Phase				(1D,2D,3D)(VL)	15-161				
Turner	Horizontal				1D(VL)	15-161				
	Horizontal									
	Phase over Phase									
USCO	Horizontal		AGT(VL)**15-230		GSH-4(VL)15-138	AGCH**	15-345			
	Horizontal					AGCH-V**	34.5-230			
	Phase over Phase				GSH-4(VL)15-138	GCH	15-23			

(L) Means gas or solid material full-load interrupters are accepted and available.

(VL) Means vacuum full-load interrupters are accepted and available.

* These switches, except 34.5 kV Allduti vertical break, are available and accepted in combination with the S & C Type SMD substation fuse cutouts listed on page af-3.

** Also available in bronze in some ratings.

NOTE: Phase-over-phase mounted switches are not acceptable above 25 kV class unless equipped with full-load interrupters. Switches of 15 kV and 25 kV classes with individual phases mounted on wood crossarms or poles must be supplied with insulated interphase and control rods.

Conditional List
cg(1)
October 1983

cg - Switch, air, three-pole, group-operated

<u>Manufacturer</u>	<u>Meeting No. and Date</u>	<u>Conditions</u>
<u>Southern States</u> "Pole-Pak" 15-23 kV	800 8/20/64	To obtain experience.
Type ES; 15, 23 and 34.5 kV (horizontal upright models only)	897 7/11/68	<ol style="list-style-type: none">1. To obtain experience.2. For 15 kV and 23 kV distribution lines: insulated interphase and control rod spacers required. See REA Drawings M3-15 and VM3-16.3. NEMA insulators and steel interphase base required for transmission line structure as in TM-3.4. Acceptable on steel substations 15 through 34.5 kV with NEMA insulators and uninsulated interphase rods.
Type 57L sidebreak, 115-161 kV, 600 and 1200 amp., horizontal upright	1067 6/12/75	To obtain experience.
<u>G & W Electric Company</u> Type MK-40A 15 kV thru 230 kV (horizontal upright mounting)	912 2/20/69	<ol style="list-style-type: none">1. To obtain experience.2. Insulated interphase and control rods required on 15 kV and 23 kV models used on wood structures.3. Steel interphase base required when mounted as in REA Drawing TM-3.

Conditional List

cg(2)

July 1983

cg - Switch, air, three-pole, group-operated

<u>Manufacturer</u>	<u>Meeting No. and Date</u>	<u>Conditions</u>
<u>G & W Electric Company (Cont'd)</u> "Mark 40"		
115 kV thru 345 kV (horizontal upright mounting)	1005 12/7/72	To obtain experience.
Type LPV, 3-pole 72.5-272 kV, 1200 amp., 1600 amp., 2000 amp., center sidebreak for horizontal mounting	1064 5/1/75	To obtain experience.
<u>Siemens-Allis</u>		
Type AVB(VL), 115-345 kV (Available in copper, 115- 138 kV, order Type CVB(VL)) (Horizontal upright mounting)	1027(10/11/73) 1154(1/4/79) 1157(2/15/79)	To obtain experience.
Type CBL-T, 15-69 kV 600 and 1200 amp (center break, horizontal upright mounting)	1100 10/21/76	<ol style="list-style-type: none"> 1. To obtain experien 2. Insulated interphase and control rods required on 15 kV and 25 kV models used on wood structures.
<u>Morgan</u>		
Type VBV(VL), horizontal upright	1056 1/2/75	<ol style="list-style-type: none"> 1. To obtain experience. 2. Pole mounted switches must be supplied with insulated interphase and control rods. (Same as above)
Pole top mtg., 15-34.5 kV H-frame mtg., 46-230 kV Substation mtg., 15-230 kV	1146 8/31/78	
Type CVB, center side-break Horizontal pole top mounting, 1/2/75 15-34.5 kV Phase-over-phase mounting, 15-23 kV H-frame and substation mounting, 15-230 kV	1056	

(L) Means full-load interrupter accepted and available.

(VL) Means vacuum full-load interrupters are accepted and available.

dt
October 1983

dt - Deadend, service

For deadending triplex type service cable, Drawing K10C.

<u>Manufacturer</u>	<u>ACSR Size</u>	<u>Wedge Type</u>	<u>Catalog No.</u>	<u>Formed Type</u>
Blackburn	4	W6-4AA		-
	2	W6-2AA		-
	1/0	W2-0AA		-
Burndy	4	CW2R-1		-
Chance	4	-	CSG-030	
	2	-	CSG-050	
	1/0	-	CSG-070	
Helical Line Products	4	-	HSG-514	
	2	-	HSG-518	
	1/0	-	HSG-522	
Joslyn	4 & 2	R7295		-
	1/0	R7287		-
Penn-Union	4 & 2	WDC-2S		-
	1/0	WDC-10S		-
Preformed Line Products	4	-	SG-4502	
	2	-	SG-4504	
	1/0	-	SG-4506	
Reliable	4 & 2	7295		-
	1/0	7287		-

du
July 1983

du - Link, Extension

<u>Manufacturer</u>	<u>DISTRIBUTION</u>	<u>Catalog Number</u>
Bethea/National		LCE-14
Chance		C207-0112
Continental		CEL-14
Flagg (MIF)		PA319
McGraw-Edison		DC33B6
Utilities Service		495
	<u>Transmission</u>	
Continental		CEL-14
Brown Boveri Electric (ITE)		3074A
Joslyn (Bolted) (High Strength)		J7712 J22609
Knox		3074A
McGraw-Edison		DC152B1

Guy Extension Link
(For "H" Structure)

<u>Manufacturer</u>	<u>One Guy Attachment</u>	<u>Two Guy Attachment</u>
Joslyn	J22421	J22523

NOTE: The distribution extension links may be substituted for anchor shackle (Item b0), eye bolt (Item o) and eye nut (Item aa) for both small and large conductor drawings shown in REA Forms 803 and 804 at the option of the owner.

Conditional List
du(1)
July 1983

du - Connecting Links

Strength Rating: 25,000 lbs. ultimate loading

<u>Manufacturer</u>	<u>Link to guy</u>	<u>Size</u>	<u>Meeting No. and Date</u>	<u>Conditions</u>
Hughes	3154 Link to <u>Insulators</u>	3/8" x 2" x 9-1/2"	1172 9/20/79	To obtain experience in conjunction with pole bands (Item fv(1))
Hughes	3176	3/8" x 3" x 9-1/2"	1172 9/20/79	

dy
October 1983

dy - Bolt, eye, double arming

Applicable Specification: ANSI C135.4, "Standards for Galvanized Ferrous Eye Bolts and Nuts for Overhead Line Construction."

Applicable Sizes : 5/8 inch, 14 through 26 inch length
3/4 inch, 14 through 26 inch length

The following manufacturers have shown compliance with the applicable specifications:

A. B. Chance Company
Dixie Electrical Manufacturing Company
Joslyn Mfg. and Supply Company
Kortick Manufacturing Company
*McGraw-Edison
Utilities Service Company

*"Static proof" designs available.



eb
October 1983

eb - Bracket, Pole Top
For Post Type Insulators

DISTRIBUTION

<u>Barron Bethea</u> (7.2 or 14.4 kV)	1B-4
<u>Bethea/National</u> (7.2 or 14.4 kV)	BPT-58F
<u>Continental</u> (7.2 or 14.4 kV)	PTB-55-8
<u>Flagg (MIF)</u> (7.2 or 14.4 kV)	P526
<u>Joslyn</u> (7.2 or 14.4 kV)	J23333
<u>Lapp (Line Ware)</u> (7.2 or 14.4 kV)	304043
<u>McGraw-Edison</u> (7.2 or 14.4 kV)	DC62B1
<u>Ohio Brass</u> (7.2 or 14.4 kV) (7.2 kV)	84324 89725

TRANSMISSION

Barron Bethea	1B-4
Bethea/National	BPT-58HF
Continental	PTB-66H
Flagg (MIF)	P532
Lapp (Line Ware)	304044
McGraw-Edison	DP29A1
Ohio Brass	84324

NOTE: Pole top bracket (Item eb) and post insulator (Item ea) may be substituted for pole top pin (Item b) and pin insulator (Item a) for both small and large conductor distribution drawings shown in REA Forms 803 and 804 at the option of the owner.

ec
July 1983

ec - Bracket, Offset Neutral

Chance	C206-0004
Dixie	D-2352
Joslyn	J2352
McGraw-Edison	DC6N1

eg
July 1983
eg - Plate, crossarm reinforcing

TRANSMISSION

For 5-5/8" x 7-3/8" crossarm

<u>Manufacturer</u>	<u>Catalog No.</u>
Chance	4047
Hughes	1113.88
Joslyn	J22672.6
McGraw-Edison	DG16M9
Utilities Services	3838

eh
October 1983

eh - Hook, ball

<u>Manufacturer</u>	<u>Catalog No.</u>
Anderson Elec./Square D	HB-30
Bethea/National	BH-5
Continental Electric Company	BH-30-5
Brown Boveri Electric (ITE)	3001
Joslyn (Brewer-Titchener)	3001-HT
Knox	3001
Lapp	7055
Lindsey	3310
Ohio Brass	78420

ga - Watthour and Watthour-Demand Meters
1Ø, 2 and 3 wire or 2/3 wire 120/240 volts

<u>Self-Contained Types</u>		Type of Base 2	Watthour Meter Type 3	Mechanical Watthour Type 4	Thermal Demand Watthour Type 5	Number of Terminals 6
Manufacturer 1	Bottom Con. Socket					
Duncan	Bottom Con. Socket	-	MS	-	-	-
General Electric	Bottom Con. Socket	150A 170S		IM50A IM70S	-	4
Sangamo	Bottom Con. Socket	J3A J4S		J3DA J4DS	J3TA J3TS	4
Westinghouse	Bottom Con. Socket	D2A D5S		D2AM D5SM	D2SH	4
<u>Transformer Rated Types</u>						
Duncan	Bottom Con. Socket	-	MS	-	-	-
General Electric	Bottom Con. Socket	150A 170S		IM50A IM70S	-	5 or 6
Sangamo	Bottom Con. Socket	J3A J4S		J3DA J4DS	J3TA J3TS	5 or 6
Westinghouse	Bottom Con. Socket	D2A D2S		D2AM D2SM	-	5 or 6

ga - Watthour and Watthour-Demand Meters
Polyphase 2 element - 3 wire, 240 volts - Delta and Network

Self-Contained Types	Type of Base	Watthour Meter Type	Mechanical Demand Watthour Type	Thermal Demand Watthour Type	Number of Terminals	
Manufacturer	1	2	3	4	5	6
Duncan	Bottom Con. Socket	MT-12S or 13S	—	—	—	—
General Electric	Bottom Con. Socket	V62A V62S	VM62A VM62S	— —	— —	5 or 8
Sangamo	Bottom Con. Socket	S2A or S3A S2S or S3S	S2DA or S3DA S2DS or S3DS	PWAP PWS or SP	5 or 8 —	—
Westinghouse	Bottom Con. Socket	— D5S5	— D5S5M	— —	— —	—
<u>Transformer Rated Types</u>						
Duncan	Bottom Con. Socket	MT-5A MT-5S	BMT-5A BMT-5S	TMT-5A TMT-5S	8	8
General Electric	Bottom Con. Socket	V63A V63S	VM63A VM63S	— —	— —	8
Sangamo	Bottom Con. Socket	S3A S3S	S3DA S3DS	PWAP PWS	— 8	—
Westinghouse	Bottom Con. Socket	D5A-2 D5S-2	D5A2M D5S2M	D4S-2H	— —	8

ga - Watthour and Watthour-Demand Meters
Polyphase 2 element - 4 wire Delta - 120/240 volts

Self-Contained Types		Type of Base	Watthour Meter Type	Mechanical Demand Watthour Type	Thermal Demand Watthour Type	Number of Terminals
Manufacturer	1	2	3	4	5	6
Duncan		Bottom Con. Socket	— Mt-15S	— BMT-15S	— TMT-15S	— 7
General Electric		Bottom Con. Socket	V66A V66S	VM66A VM66S	— —	7 —
Sangamo		Bottom Con. Socket	S6A S6S	S6DA S6DS	PWA Delta PWS Delta	— 7 or 8
Westinghouse		Bottom Con. Socket	D5A7 D5S7	D5A7M D5S7M	— —	7 or 8 —

Transformer Rated Types

Duncan

General Electric

Sangamo

Not shown in REA Bulletin 161-12

Westinghouse

ga-4
October 1983

ga - Watthour and Watthour-Demand Meters
Polyphase - 2-1/2 element - 4 wire wye - (120/208) (277/480) volt

<u>Self-Contained Types</u>		Type of Base	Watthour Meter Type	Mechanical Demand Watthour Type	Thermal Demand Watthour Type	Number of Terminals
Manufacturer	Bottom Con. Socket	MT-14S	MT-14S	MT-14S	MT-14S	6
	2	3	4	5	5	6
Duncan	Bottom Con. Socket	-	-	-	-	-
General Electric	Bottom Con. Socket	V65A V65S	VM65A VM65S	-	-	7
Sangamo	Bottom Con. Socket	S5A S5S	S5DA S5DS	PWAY PWSY	-	-
Westinghouse	Bottom Con. Socket	D5A8 D5S8	D5A8M D5S8M	-	-	7 or 8
				-	-	7
				-	-	-
<u>Transformer Rated Types</u>						
Duncan	Bottom Con. Socket	MT-6A MT-7S or 6S	BMT-6A BMT-7S or 6S	VM65A VM65A	TMT-6A TMT-7S or 6S	10 7 or 13
General Electric	Bottom Con. Socket	V65A V65S	VM65A VM65A	-	-	7 or 13
Sangamo	Bottom Con. Socket	S5A S5S	S5DA S5DS	PWAY PWSY	-	13
Westinghouse	Bottom Con. Socket	D5A8 D5S8	D5A8M D5S8M	D4S8H	-	13

ga - Watthour and Watthour-Demand Meters
Polyphase - 3 element - 4 wire wye - (120/208) (277/480) volt

<u>Self-Contained Types</u>		Type of Base 2	Watthour Meter Type 3	Mechanical Watthour Type 4	Thermal Demand Watthour Type 5	Number of Terminals 6
Manufacturer 1	Bottom Con. Socket					
Duncan	Bottom Con. Socket	—	MT-16S	— BMT-16S	— —	— 7
General Electric	Bottom Con. Socket	V64A V64S		VM64A VM64S	— —	— 7 or 8
Sangamo	Bottom Con. Socket	S4A S4S		S4DA S4DS	— —	— 7 or 8
Westinghouse	Bottom Con. Socket	D5-A3 D5-S3		D5A3M D5S3M	— —	— 7 or 8
<u>Transformer Rated Types</u>						
Duncan	Bottom Con. Socket	MT-9A MT-9S	or 10S	BMT-9A BMT-9S or 10S	— —	12 13
General Electric	Bottom Con. Socket	V64A V64S		VM64A VM64S	— —	— 13
Sangamo	Bottom Con. Socket	S4A S4S		S4DA S4DS	— —	— 13

Conditional List
ga(1)
July 1983

ga - Watthour and Watthour-Demand Meters

<u>Manufacturer</u>	<u>Meeting No. and Date</u>	<u>Conditions</u>
<u>General Electric</u> Socket or bottom connected watthour and watthour-demand meters, 2.5 amp., Class 20, V-60 and VM-60 Series	907 12/5/68	1. To obtain experience. 2. To be used only where Class 20 meters are permitted by local regulatory bodies.
<u>Westinghouse</u> Socket or bottom connected watthour and watthour-demand meters, 2.5 amp., three element Class 20, Types D4S-3, D4S-3M, D4A3 and D4A3M. Types D4A8, D4S8, D4A8M, D4S8M, D4A2, D4S2, D4A2M and D4S2M Socket base, 3 wire, 1Ø watthour meter, Type D4S, Class 320	960 2/4/71 1089 4/29/76 1149 10/19/78	1. To obtain experience. 2. To be used only where Class 20 meters are permitted by local regulatory bodies. 1. To obtain experience. 2. To be used only where Class 320 meters are permitted by local regulatory bodies. 3. To be used only with sockets rated for Class 320 service.
<u>Duncan</u> Special base, 3 wire, 1Ø watthour meter, Type MS-K, Class 400 watthour and mechanical demand Type BMS-K watthour and thermal demand Type TMS-2K Socket base, 3 wire, 1Ø watthour meter, Type MS-E, Class 300	947 7/9/70 1113 4/28/77 1113 4/28/77	1. To obtain experience. 2. To be used only where Class 400 meters are permitted by local regulatory bodies. 1. To obtain experience. 2. To be used only where Class 300 meters are permitted by local regulatory bodies. 3. To be used only with sockets rated for Class 300 service.

sr - Steel for Substation Grounding, Copper-Clad or Galvanized
(See page av-2 for copper grounding conductor)

<u>Manufacturer</u>	<u>Meeting No. and Date</u>	<u>Conditions</u>
<u>Copperweld Steel</u>		
40% conductivity DSA	954	1. To obtain experience.
Copperweld Strand in sizes:	10/29/70	
1/2" (7 No. 6 AWG)		2. When used in soil with
9/16" (7 No. 5 AWG)		resistivity of 25 ohm-meters
5/8" (7 No. 4 AWG)		(2500 ohms per centimeter
13/16" (19 No. 6 AWG)		cube) or less, cathodic
7/8" (19 No. 5 AWG)		protection must be incorpor-
		ated into the grounding
		design.
<u>Indiana Steel & Wire</u>		
Steel strand, BB grade,	1004	1. To obtain experience.
Class C galvanized	11/16/72	
5/8" (19 wire)	1133	2. When used in soil with
1/2" (7 wire)	2/16/78	resistivity of 25 ohm-meters
9/16" (7 wire)		(2500 ohms per centimeter
7/16" (7 wire)		cube) or less, cathodic
		protection must be incorpor-
		ated into the grounding
		design.
<u>Bethlehem Steel</u>		
7/16" and 1/2" steel	1015	1. To obtain experience.
strand, BB grade,	4/26/73	
Class C galvanized		2. When used in soil with
		resistivity of 25 ohm-meters
		(2500 ohms per centimeter
		cube) or less, cathodic
		protection must be incorpor-
		ated into the grounding
		design.

vx
October 1983

vx - Cross brace assembly, 3-3/8" x 5-3/8"
with hardware & fittings (Dwg. TM-110, REA Spec. T-7)

<u>Manufacturer</u>	<u>Catalog No.</u>
<u>American Crossarm & Conduit</u>	
Item 1-vx	1100-1
Item 2-vx	1100-2
<u>Hughes Bros.</u>	
Item 1-vx	1042-1
Item 2-vx	1042-2
<u>Brooks Lumber</u>	
Item 1-vx	X6685-1
Item 2-vx	X6685-2
<u>Joslyn</u>	
Item 1-vx	1-J6046
Item 2-vx	2-J6046
<u>Niedermeyer-Martin</u>	
Item 1-vx	N-6714-1
Item 2-vx	N-6714-2
<u>Cascadian</u>	
Item 1-vx	CCC-67-1
Item 2-vx	CCC-67-2

Cross Brace Assembly, 3-5/8" x 7-1/2" Min.
with hardware and fittings

Applicable Specification: T-8
Drawing: TM-110A

<u>Manufacturer</u>	<u>Catalog No.</u>
American Crossarm & Conduit	1200
Brooks	X-6695
Cascadian	CCC69
Hughes	2061A
Joslyn	J6048
Niedermeyer-Martin	N6721

zz-5
October 1983

zz - Poles

Pressure Treatment

	<u>Insured Warranted</u>	<u>Independently Inspected</u>
Oliver Treated Products Co., Inc.	-	Hammond, La.
Pacific Wood Preserving	-	Cloverdale, Cal.
Panama Timber Co.	-	Panama, Okla.
Penta Wood Products, Inc.	-	Siren, Wisc.
Pressure Treated Timber Co.	-	Boise, Idaho
Selma Treating Company	-	Selma, Cal.
Southern Wood Piedmont Co.	-	Augusta, Ga. Baldwin, Fla. East Point, Ga. Macon, Ga. Wilmington, N.C.
Southeastern Wood Preserving, Inc.	-	Canton, Miss.
Southwest Forest Industries	Prescott, Ariz.	Prescott, Ariz.
Stallworth Timber Co., Inc.	-	Beatrice, Ala. Winnfield, La.
Standard Wood Preservers of Shreveport, Inc.	-	Shreveport, La.
Swift Lumber Co., Inc.	-	Atmore, Ala.
John C. Taylor Lumber Sales, Inc.	-	Sheridan, Ore.
Texas Electric Cooperative, Inc.	-	Jasper, Texas

July 1983

zz - Poles

Pressure Treatment

	<u>Insured</u> <u>Warranted</u>	<u>Independently</u> <u>Inspected</u>
Texas Tie & Timber Co. (W. J. Smith Wood Preserving Co.)	-	Denison, Texas
Tri-State Pole & Piling, Inc.	-	Du cedale, MS
Union Timber Corp.	-	Homerville, Ga.
Weekly Lumber Co.	-	Rockledge, Fla. Tampa, Fla.
Western Tar Products Corp.	-	Terre Haute, Ind.
Western Wood Preservin Co.	-	Sumner, Wash.
Wheeler Div., St. Regis Paper Company	Whitewood, S. D. Cass Lake, Minn.	Whitewood, S. D. Cass Lake, Minn.
Whitewood Post & Pole Co.	Whitewood, S. D.	Whitewood, S. D.
Wood Treating, Inc.	-	Picayune, Miss.
Wyckoff Company	-	W. Seattle, Wash. Bainbridge Island, Wash.
Weyerhaeuser Company	-	DeQueen, Ark.

U ae - Arresters, Surge
(For underground system pole risers or pad-mounted equipment)

(Shielded for Underground System Pad-Mounted Equipment)

<u>Manufacturer</u>	<u>Meeting No. and Date</u>	<u>Conditions</u>
<u>McGraw-Edison</u>		
Metal oxide, AMOV1 U.D. 10, 18 kV	1223 11/19/81	To obtain experience.
<u>RTE</u>		
Metal Oxide Elbow Arrestor M.O.V.E. 9, 18 kV	1185 4/24/81	To obtain experience.
(For Underground System Pole Risers)		
<u>General Electric</u>		
Metal Oxide, Tranquell U.D. 10, 18 kV	1185 4/24/80	To obtain experience.
Metal Oxide, Tranquell Intermediate Class 9, 10, 18 kV	1197 10/9/80	To obtain experience.
<u>Joslyn</u>		
Metal Oxide, Type ZJ U.D. 9, 10, 18 kV	1266 9/22/83	To obtain experience.
Metal Oxide, Type ZR Intermediate Class* 9, 10, 18 kV	1266 9/22/83	To obtain experience.
<u>McGraw-Edison</u>		
Metal Oxide, AVZ1B 9/10, 18 kV	1223 11/9/81	To obtain experience.
<u>Ohio Brass</u>		
Metal Oxide, DynaVar VR UD 9, 10, 18 kV	1236 6/10/82	To obtain experience.
Metal Oxide, DynaVar Intermediate Class 9, 10, 18 kV		

*Has intermediate class arrester characteristics but does not have intermediate class venting capability.

U an-1.1
October 1983

U an - Transformers, distribution
pad-mounted, dead-front

(For underground application)

Applicable Specifications: "REA Specifications for Pad-Mounted
Transformers," U-5.

<u>Manufacturer</u>	<u>Single Phase</u>	<u>Three-Phase</u>
Central Moloney (2,4)	"REA-LP" 25-167 kVA	
Dowzer (3,4)	"METRI-PAD" 25-167 kVA	"PM3W-R" 75-500 kVA
ERMCO (1) (4,6) (2,4)	"Trimline" 10-50 kVA "Low-Profile" 10-50 kVA "Low-Profile" 75 kVA	
General Electric (2,4)	"Mini-Pad III - REA" 10-167 kVA	"Compad II - REA" 75-2500 kVA
Howard (2,4)	"HiPad REA" 10-167 kVA	"HiPad 3 REA" 45-2500 kVA
Kuhlman (2,4)	"Lo-Pak ALR" 25-167 kVA	
McGraw-Edison (2,4)	Series 20/20 REA 25-167 kVA	"REA Pad-Mount" 75-2500 kVA
NECO (2)	HMM-R, 10-50 kVA SP-R, 75-167 kVA	TP-R, 45-1000 kVA
Pauwels-Chance (2)	"Turf Hugger-R" 10-100-kVA	"Turf Hugger-R" 45-500 kVA
H. K. Porter (2,4) (Delta-Star)	"Low Profile U 5-R" 25-167 kVA	"Porter U5-R3" 225-2500 kVA
RTE (2,4)	"REA Shrubline" 15-167 kVA	"REA Terra-Tran" 45-2500 kVA
United (Ky, AEC) (2,4)	"Pad-Mount" 15-75 kVA	

(1) 7.2/12.5 and 7.6/13.2 kV
(2) 7.2/12.5, 7.6/13.2 and 14.4/24.9 kV
(3) 7.2/12.5 and 7.6/13.2 kV (conditional listing for 14.4/24.9 kV)
(4) Dual voltage - same as for 14.4/24.9 kV, single phase
(5) Three-phase listing applies to 7.2/12.5 and 7.6/13.2 kV only
(6) 14.4/24.9 kV

U an-2
October 1983

U an - Transformers, distribution
pad-mounted, dead-front

(For unit residential underground application, 7.2/12.5
and 7.6/13.2 kV, 5-25 kVA single phase only)

<u>Manufacturer</u>	<u>Type</u>
Central Moloney	"REA-Mini-LP" 10-25 kVA
ERMCO	"REA-Micro Pad" 10-25 kVA
General Electric	"Micro-Mini-Pad" 10-25 kVA
Howard	"Spacesaver Pad" 10-25 kVA
Kuhlman	"K-Pak AKR" 10-25 kVA
McGraw-Edison	"Series 10/15 REA" 10-25 kVA
NECO	"Little NECO-R" 10-25 kVA
Pauwels-Chance	"Turf Hugger II" 10-25 kVA
RTE	"Ranch Runner" 10-25 kVA
VanTran	"Mite'E'Mini" 5-25 kVA
Westinghouse	"Micro-Pak U-5" 10-25 kVA

U an-1.2
July 1983

U an - Transformers, Distribution,
Pad-mounted, Dead-Front

(For Underground Application)

Applicable Specifications: REA Specifications for Pad-Mounted
Transformers - U-5

<u>Manufacturer</u>	<u>Single Phase</u>	<u>Three Phase</u>
VanTran (3,4)	"Mini Pad U5" 5-167 kVA	"VanPad III-U5" 30-2500 kVA
<p>Wagner (Turbodyne) (2,4) "Turfline II-R" 25-167 kVA</p>		
Westinghouse (2,4)	"Mini-Pak U-5" 25-167 kVA	CTP-U5, 75-500 kVA "Plazapad - U5" 750-2500 kVA

- (1) 7.2/12.5 and 7.6/13.2 kV
- (2) 7.2/12.5, 7.6/13.2 and 14.4/24.9 kV
- (3) 7.2/12.5 and 7.6/13.2 kV (conditional listing for 14.4/24.9 kV)
- (4) Dual voltage - same as for 14.4/24.9 kV, single phase
- (5) Three-phase listing applies to 7.2/12.5 and 7.6/13.2 kV only

U ax - Cutout and Arrester

Combination for Underground System Pole Risers

Nominal System Voltage	For 12.5Y/7.2 kV	For 13.2Y/7.6 kV	For 24.9Y/14.4 kV	Conditions
Cutout Maximum Voltage Rating	7.8 kV	15 kV	15 kV	27 kV
Application	10 Risers	30 Risers	10 and 30 Risers	10 and 30 Risers
Cutout Current Rating	100 amps	100 amps	100 amps	100 amps

Metal Oxide Type Arresters

Manufacturer	Catalog Numbers
Joslyn (Distribution) Meeting 1266 (9-22-83)	J9237-ZJ2 J9237-ZJ2/R J9237-ZJ2/R J9267-ZJ2

To obtain experience.

Note 1: Other arresters listed on pages ae-1 and ae-2 may be used for underground systems when applied in accordance with REA Bulletin 61-3, "Underground Rural Distribution."

Note 2: Cutouts used on underground riser poles should be loadbreak type or have hooks for portable load interrupters.

Conditional List
U ax(1)
October 1983

U he - Enclosures, Sectionalizing Equipment

<u>Manufacturer</u>	<u>Meeting No. and Date</u>	<u>Conditions</u>
	<u>7.2/12.5 kV</u>	
<u>McGraw-Edison</u> EH3A Series, single- phase, pad-mounted	1065 5/15/75	To obtain experience.
<u>Malton</u> MEF21	1108 2/17/77	To obtain experience.
<u>S & C</u> Mark III, Models PMS (with option G-7) 200 ampere three-pole switching and 200 ampere single-pole switching	1112 4/14/77 1198 10/23/80 1202 12/18/80	To obtain experience.
<u>Westinghouse</u> UTE, PAD-PAK pad-mounted switching device, single and three-phase, 300 amp	1151 11/16/78	To obtain experience.
<u>G & W</u> PLDR, PFLDR (submersible and pad-mounted) single-phase and three-phase, fused or unfused switchgear. (Choice of deep well or deadbreak bushings) (must specify pentahead security bolt when ordering)	1200 11/20/80	To obtain experience

NOTE 1: Enclosures on this page must comply with the deadfront requirements of REA Spec. U-4.

NOTE 2: Single-pole switching of three-phase underground circuits may cause ferroresonance. Refer to REA Bulletin 61-3.

Conditional List

U he(2)

October 1983

U he - Enclosures, Sectionalizing Equipment

<u>Manufacturer</u>	<u>Meeting No. and Date</u>	<u>Conditions</u>
	<u>14.4/24.9 kV</u>	
<u>Elliott</u>		
Type EPMR, single- and three-phase, pad-mounted	1030 11/21/73	To obtain experience.
<u>Powercon</u>		
Type PMF, single-phase pad-mounted	998 8/17/72	To obtain experience.
Type PMF, three-phase pad-mounted		
<u>RTE</u>		
Type LBS, single- and three-phase, pad- mounted, 300 amp	1095 8/11/76	To obtain experience.
<u>Inter-Alloys</u>		
Uni-Versal single- and three-phase pad-mount fusible switchgear and loadbreak switches Series UV-FL	1133 2/16/78	To obtain experience.
<u>Westinghouse</u>		
UTE, PAD-PAK pad-mounted switching device, single and three-phase, 200 amp	1151 11/16/78	To obtain experience.

NOTE 1: Enclosures on this page must comply with the dead-front requirements of REA Specification U-4.

NOTE 2: Single-pole switching of three-phase underground circuits may cause ferreresonance. Refer to REA Bulletin 61-3.

U hv-2
July 1983

U hv - Cable, Underground
25 kV Cable

Applicable Specification: REA Specification U-1
Conductor : Copper or Aluminum
 #2 AWG through 1000 kcmil
Insulation : High Molecular Weight (HMW) or cross-linked (XL) polyethylene
Neutral : Copper Concentric Neutral

<u>Manufacturer</u>	<u>Insulation</u>	<u>Flat Strap Neutral Available</u>	<u>Stabilized Neutral Design*</u>
Alcoa	HMW or XL	Yes	Ridg-Lok
Anaconda Ericsson	XL	No	
Essex	XL	Yes	
Hendrix	HMW or XL	No	Neu-Lok
Okonite	XL	Yes	
Phelps Dodge	XL	Yes	
Pirelli	HMW or XL	Yes	STA-SERVE
Reynolds	HMW or XL	Yes	Secure-Neutral
Rome	HMW or XL	Yes	Serve-Lock
Southwire	XL	No	Counter-Secure
Triangle	XL	Yes	

*Accepted design meeting the requirements of 7.5.2 REA Specification U-1, for a minimum neutral with a maximum lay.

U hv-3
October 1983

U hv - Cable, Underground

600 Volt Cable

Applicable Specification: REA Specification U-2
Conductor : Copper, #4 AWG and larger
 : Aluminum, #2 AWG and larger
Insulation : Cross-linked polyethylene (XLPE)

<u>Manufacturer</u>	<u>Type Conductor</u>
Alcan	Copper or Aluminum
Alcoa	Aluminum
Anaconda Ericsson	Copper or Aluminum
Collyer	Copper or Aluminum
Essex	Copper or Aluminum
General Electric	Copper or Aluminum
Hatfield	Copper
Kaiser	Aluminum
Okonite	Copper or Aluminum
Phelps Dodge	Copper or Aluminum
Phillips Cables, Inc. (Marked "Phillips W")	Copper or Aluminum
Pirelli	Copper or Aluminum
Reynolds	Copper or Aluminum
Rome Cable	Copper or Aluminum
Southwire	Copper or Aluminum
Triangle	Copper or Aluminum

NOTE: The manufacturers shown above have indicated that their 600 volt cable is suitable for use on 480 volt corner grounded delta circuits.

The above cable may be supplied with UL label for Type USE.

U hv - Cable, Underground

600 Volt Multi-Conductor Cable

Applicable Specification: REA Specification U-2
Conductor : Copper, #4 AWG and larger
 Aluminum, #2 AWG and larger
Insulation : Cross-linked polyethylene (XLPE)
Cable Configuration : 3 Insulated Conductors Triplexed

<u>Manufacturer</u>	<u>Type Conductor</u>
Alcan	Copper or Aluminum
Alcoa	Aluminum
Anaconda Ericsson	Copper or Aluminum
Essex	Copper or Aluminum
General Electric	Copper or Aluminum
Hatfield	Copper
Kaiser	Aluminum
Okonite	Copper or Aluminum
Phillips Cables, Inc. (Marked "Phillips W")	Copper or Aluminum
Pirelli	Copper or Aluminum
Reynolds	Copper or Aluminum
Rome Cable	Copper or Aluminum
Southwire	Copper or Aluminum
Triangle	Copper or Aluminum

NOTE: The above cable may be supplied with UL label for Type Use.

Conditional List

U hv(l)

July 1983

U hv - Cable, Underground
(15 or 25 kV cable)TREE RETARDANT

<u>Manufacturer</u>	<u>Meeting No. and Date</u>	<u>Conditions</u>
<u>Reynolds</u>		
Reynotree-U (DFDA-6202 HMW)	1151(11/16/78) 1196(9/18/80) 1255(3/24/83)	To obtain experience
HEFD-4202 (XL)	1258(5/5/83)	To obtain experience
<u>Rome Cable</u>		
DFDA-6202 HMW	1155(1/18/79) 1196(9/18/80)	To obtain experience
<u>Hendrix</u>		
DFDA 6202 HMW	1151(11/16/78) 1198(10/23/80)	To obtain experience
<u>Alcoa</u>		
DFDA 6202 HMW	1148(9/28/78) 1198(10/23/80)	To obtain experience
<u>Pirelli</u>		
DFDA-6202 HMW	1152(12/7/78) 1202(12/18/80)	To obtain experience
<u>Essex</u>		
DFDA 6202 HMW	1236(6/10/82)	To obtain experience.

Conditional List
U ja(2)
October 1983

U ja - Transformer Pad (Sleeve)

<u>Manufacturer</u>	<u>Meeting No. and Date</u>	<u>Conditions</u>
<u>Associated Plastics</u> Transformer pad and box assembly, API 4242 RPM Pad 1730 Box API 16, API 45	1194 9/4/80 1259 5/19/83	To obtain experience.
<u>Concast</u> Fibercrete modular bases	1125 10/21/77	To obtain experience.
<u>Continental Columbus</u> CW-GS-P Series	1164 5/24/79	To obtain experience.
<u>Electri-Glass, Inc.</u> BP-2000	1164 5/24/79	To obtain experience.
<u>Formex</u> Transformer pad and box assembly TP-REA Series Pad 1730-A Series Box	1164 5/24/79	To obtain experience.
<u>Highline</u> Box pad HL-45A Size: L-43", W-34-1/2", D-32"	1002 10/12/72	To obtain experience.
<u>Nordic</u> GS Series Fiberglass	1255 3/24/83	To obtain experience.

*Order by catalog number and size.

Conditional List

U jb

July 1983

U jb - Splice Shield
(Refer to Drawing UM45-4)

<u>Manufacturer</u>	<u>Meeting No. and Date</u>	<u>Conditions</u>
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Kellems No. SE 594-2	1035 2/21/74	To obtain experience.
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